

A Win-Win Situation

ARS Conducts Irrigation Research for an American Indian Tribe

Many Agricultural Research Service employees enjoy working with their local communities. Maybe it's answering citizens' questions at a laboratory's open house. Maybe it's mentoring local high school students.

For rangeland scientist Chad Boyd it's conducting research to help a local American Indian tribe effectively manage its meadows and rangeland.

In the late 1990s, the Burns Paiute Tribe of eastern Oregon bought nearly 2,000 acres of the nearby Logan Valley—land the tribe had used for centuries. The land was originally bought by the Nature Conservancy from a local ranching corporation and held until the tribe and a regional energy company were able to purchase it. This energy company works with tribes that have suffered cultural losses through the construction and operation of hydroelectric dams that block salmon migration routes and affect wildlife.

But there were concerns with the area. Mountain meadows are commonly flood-irrigated throughout the western United States. The property had been flood-irrigated by the previous owner—but not since its 1999 sale. Should the tribe resume flood irrigation? Doing so may change the water temperature and amount in the streams. This in turn could possibly affect the red band trout and the threatened bull trout. But if the ground were not irrigated, many of the native plants—some of which are culturally important to the tribe—could decrease.

Historically, beavers served as irrigators of the land by constructing dams. Their dams spread the water across the land like today's flood irrigation does. But there are not many beavers left in the Logan Valley area today.

So the tribe called Boyd at ARS's Eastern Oregon Agricultural Research Center, Burns, Oregon, to provide relevant research to help them decide the best management practices for the land.

Boyd, who estimates he spends 30

PEGGY GREB (K10787-1)



Rangeland scientist Chad Boyd (right) and Jess Wenick, Burns Paiute wildlife program manager, measure streamflow within the irrigated reach of Lake Creek in Logan Valley, Oregon.

PEGGY GREB (K10790-1)



Technician Joanna Hurlburt collects plant specimens along Lake Creek in Logan Valley, Oregon. Plant species composition is being monitored with and without flood irrigation.

percent of the time doing research on tribal land, sees his research as a win-win situation. "We are able to interact in a way that is very positive for ARS and for the tribe," Boyd explains. He has found a "great site" to conduct flood-irrigation research, and the tribe gets his results, which help them manage their land. But the results apply well beyond the local site. There is a great deal of interest in research on riparian management and water quality in the western United States.

One goal of the research is to determine long-term effects of flood irrigation on vegetation. Boyd explains, "With flood irrigation, there will likely continue to be a mix of wet, mesic, and dry meadow types of vegetation, increasing the habitat diversity for a variety of wildlife species, as well as retaining a high diversity of plant species."

The research started in 2002 with Boyd looking at four aspects. First, he used a flow meter to measure the flow of the stream at various points. He also measured the temperature of the stream to see how flood irrigation changes it. "When you take water out of a creek, you decrease the water volume of the creek, and temperature could potentially rise faster," Boyd says. But, if the irrigated water raises the water table, then when the groundwater goes back into the creek, it may cool the stream's water temperature, since groundwater is cooler than stream water.

Boyd also looked at the depth of the water table before and after flood irrigation. Finally, he looked at plant species composition to determine what vegetation types grew with and without flood irrigation.

Initial research suggests potential benefits with flood irrigation, and this pleases Jess Wenick, wildlife program manager for the tribe: "We now may have justification for the irrigation."

Boyd is studying the idea of whether some of the irrigated water could effectively be stored in the soil and released

during the summer low-flow period. With flood irrigation, the water table near the creek is raised, that is, the amount of water in the soil is increased. Some of the water is used by plants, and some evaporates. What remains can eventually seep back into the creek. This could potentially increase the flow of the water during the normal summer low-flow periods. "There is little previous research on the residence time of diverted water in this type of meadow," Boyd explains.

There is more to the ARS-Paiute relationship than just the flood irrigation research project. The local high school did not have an agricultural education program but wanted one. Boyd did not have a research assistant but wanted one. So now the school and ARS have hired Jimmy Zamora, who works half time as an agricultural education instructor at the school and half time with the Burns center as part of a special ARS-Burns School District partnership. Zamora has had the opportunity to involve his students in hands-on field research as well.

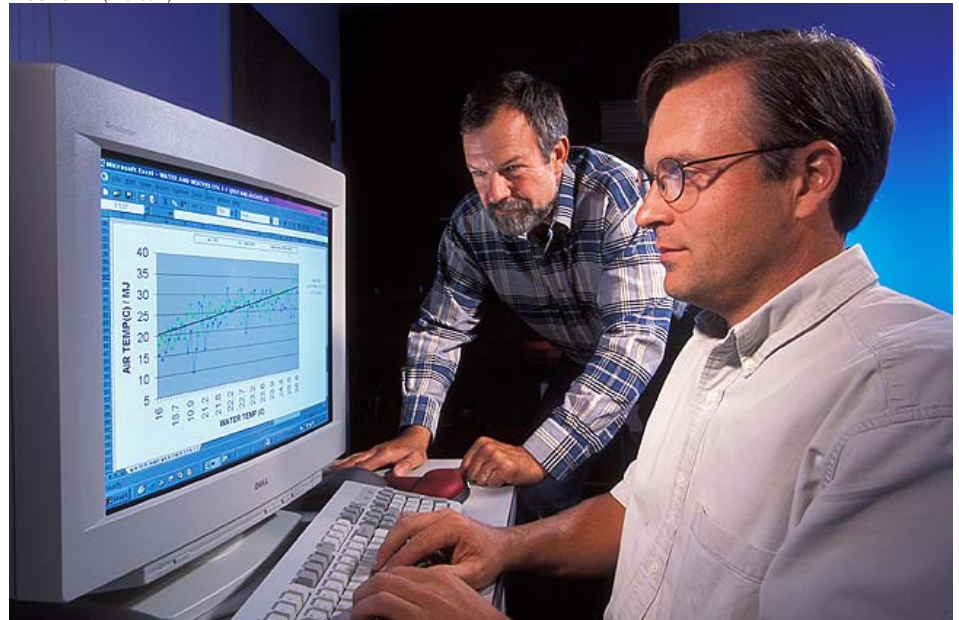
The high school wants to improve its graduation rate, and as a result, a goal of the partnership is to show the students some of the rewarding careers in agriculture and natural resources. "The tribe wanted the Logan Valley site and the high school program to serve as models demonstrating the value of education," according to Tony Svejcar, research leader of the ARS center.

Boyd has conducted more than a year of pre-treatment pre-irrigation research and hopes to do at least 2 years of post-treatment research.—By **David Elstein**, ARS.

This research is part of Rangeland, Pasture, and Forages, an ARS National Program (#205) described on the World Wide Web at www.nps.ars.usda.gov.

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PEGGY GREB (K10793-1)



Boyd (right) and research leader Tony Svejcar examine stream water temperature data from Lake Creek in Logan Valley, Oregon. Stream water temperature is an important concern in assessing the effects of flood irrigation.

PEGGY GREB (K10792-1)



Jimmy Zamora, high school agricultural education instructor and ARS technician, explains procedures for measuring groundwater depth to local high school students. Measurements of groundwater depth provide insights into the influence of flood irrigation on soil water availability.